RECONNAISANCE, SURVEILLANCE, TARGETING ACQUISITION (RSTA)

Background

In the 21st Century, the Marine Corps will fulfill its national security role through execution of *Expeditionary Maneuver Warfare* (EMW), the over-arching warfighting concept that operationalizes the Corps' vision for the future as outlined in *Marine Corps Strategy 21,* and describes how the Marine Corps will organize, deploy, and employ operating forces. Conducting operations across the full spectrum of conflict, ranging from peacetime engagement, humanitarian assistance, disaster relief, and peacekeeping, the Marine Corps will primarily organize as a Marine Air Ground Task Force (MAGTF), and operate in a Joint/Combined environment.

One of a number of challenging operations will be the *Ship-to-Objective Maneuver* (STOM), as described in the 1997 warfighting concept, that requires greatly increased air and ground mobility, seamless over-the-horizon

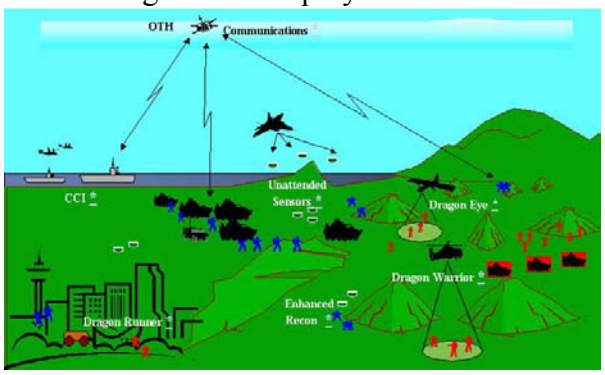
(OTH) communications, improved seabased logistics, and enhanced tactical Reconnaissance, Surveillance, and Target Acquisition (RSTA) capability. While *STOM* describes a seamless attack from the seabase to objectives well beyond the coastline, the imperatives of tactical operations will change as events unfold. Unit commanders maneuvering at sea -- often in darkness, toward selected Littoral Penetration Points (LPP) on a hostile shore -- will not be *controlled* in the conventional sense. Their actions, however, are *coordinated* to prevent the unforeseen actions of one unit creating a disadvantage for another.

The MAGTF's RSTA system and related command and control (C2) architectures must provide timely and relevant information during this crucial phase of a STOM. However, the additional speed, maneuverability, and range of STOM operations add potential risk. As forces are more dispersed, a networked tactical RSTA grid is essential to prevent surprise and to provide mutual support. An effective RSTA system under the control of the Marine commander at the tactical level is a key risk mitigation enhancement. National-level, theater, and Joint products will not and cannot fully satisfy tactical information requirements.

The organic tactical RSTA system is the primary means that Marine commanders at all levels have to collect tactically relevant information to amplify information available from the external assets. The tactical RSTA system is a grid fed from the bottom up; therefore, the tactical units at the company level are the foundation of any RSTA system. Accordingly, a stand alone capability must exist within the infantry battalion that is capable of coordinating the employment of organic RSTA assets to support the commander's information needs in the areas of (1) situational awareness and force protection, (2) indications and warning (I&W), (3) planning and execution, and (4) battle damage assessment.

RSTA Components. The RSTA system contains two crucial components, the ***RSTA Grid*** and the ***Common Tactical Picture***.

The RSTA Grid. The *RSTA Grid* is a network of forces and sensors within the area of operations. This network, composed of mechanical and human sensors – individual Marines and Marine operating units -- provides reconnaissance, surveillance, and target acquisition for a prescribed area. ***A seamless information-sharing network must link grid components***. Since RSTA assets are information gathering resources, the planning for and establishment of the RSTA Grid must be linked to the commander's information requirements and targeting priorities. Using the requirements and priorities as inputs, the Intelligence Preparation of the Battlespace (IPB) process will guide the intelligence collection plan. The intelligence collection plan functions as the major factor in determining how to employ and allocate



RSTA assets to create the grid. The grid is an integrated collection of RSTA assets positioned at various locations within the battlespace designed to meet commanders' information requirements. The grid must be rapidly moveable, flexible and adaptable in order to respond to the dynamic requirements of the battlespace.

Common Tactical Picture. The CTP is the most current depiction of a prescribed battlespace in a comprehensible visual display of all known or suspected units, to include friendly, enemy, and pending tracks. The CTP is derived from the common tactical database (CTD) and other sources and refers to the depiction of the battlespace for a single operation within a commander's area of operations. The CTP includes current, anticipated or projected, and planned

dispositions of hostile, neutral, and friendly forces. The CTP includes force location and real time and non-real time sensor information. This visual display of the battlespace is derived from the combination of intelligence data from higher echelons – specifically the Joint Intelligence, Surveillance and Reconnaissance (JISR) – and the tactical RSTA grids. The RSTA grid, comprised of mechanical and human sensors, provides real and near real time information to the CTP that enables commanders to make timely decisions. This battlefield picture creates battlespace awareness and provides a common understanding of the battlespace among MAGTF units and commanders. The processed data and information is automatically portrayed in such a manner as to permit pattern recognition and implicit understanding among commanders at all echelons in order to facilitate effective decision-making and decentralized execution.

Tactical RSTA System Developmental Priorities. The measure of effectiveness of any RSTA system is its ability to meet the battlespace information needs of tactical commanders and decision makers. The challenge inherent in expeditionary maneuver warfare is to provide timely, relevant information to rapidly maneuvering forces throughout the range of naval expeditionary operations. Developmental efforts must focus

on devising and improving Marine Corps RSTA capability in the following areas:

- Battlespace/situational awareness via a networked array of sensors.
- Flexibility and survivability of sensors.
- Rapid planning and decision making through information processing and display of various forms of information.
- Supporting multiple, high tempo operations consistent with maneuver warfare.
- Timely and accurate target acquisition and BDA.
- Force protection.
- Automated links from the RSTA Grid to CTD/CTP.

Therefore, experimentation will be designed to support these developmental efforts by focusing on the following related characteristics necessary for an effective RSTA system:

Connectivity

The RSTA system must be able to transmit accurate and timely information to those who must receive it, when they need it. Connectivity depends on active management of the information flow. Tailoring information to the needs of the commander prevents critical intelligence from being delayed or lost in irrelevant data. Information on vital enemy targets acquired by RSTA assets becomes useless unless disseminated in a timely fashion to the forces tasked to attack and destroy the targets. Interoperability, commonality, and connectivity improve and unify RSTA capabilities and enhance planning and execution.

The ability to operate with the other services and likely coalition partners is a fundamental design criteria for a RSTA system. Properly engineered, the RSTA system will be useful for a broad range of naval, joint and coalition missions. Interoperability and commonality also improve the overall capability of RSTA through cross cuing[1], information enhancement, and analytical exchange to accurately portray the battlefield. The multidiscipline, multisource approach reduces the risk of deception by the enemy.

Responsiveness

RSTA assets must be sufficiently responsive to meet the needs of the commander at any point along the operational continuum and in any scenario. Commanders at all levels should have RSTA assets available to provide information when and where needed. The responsiveness of the RSTA assets available to any commander must be looked at in aggregate and be driven by the missions that must be accomplished. The commander must examine the range of required missions and ensure that appropriate and sufficient RSTA assets are employed and positioned to meet C2 needs.

Survivability

Survivability must be commensurate with the threats to which the RSTA assets will be exposed during the course of operations. These assets must be as survivable as the operational systems and forces they support. Survivability must be assessed for the entire RSTA system—collection platforms, sensors, communications and data links, ground stations, processing facilities, personnel and operators, etc. Not all systems, or nodes within a system, need to have the same degree of survivability. Nevertheless, technology can enhance survivability of many unmanned,

[1] Cross cuing is the capability of the RSTA grid to use the triggering of one sensor to activate other sensors to classify an event or signal of interest.

remote sensors. Miniaturization will complicate enemy counter-collection efforts, and larger numbers of distributed small, inexpensive sensors provide redundancy and flexibility in the event of losses. In addition, low probability of intercept; low probability of detection (LPI/LPD) communications will both enhance survivability and security. Many RSTA assets will be vulnerable and relatively scarce. Commanders must prioritize the use of RSTA assets and consider how they would compensate for the loss of a RSTA capability should any specific asset or group of assets be destroyed or become unavailable. Besides careful planning, intelligent tasking, and effective employment tactics, redundancy and overlap of capability are perhaps the best ways of ensuring the survivability of specific RSTA capabilities and functions.

Adaptability

In addition to providing the commander the information he needs to facilitate the decision-making process, the RSTA system must be adaptable enough to be deployed on and employed from various platforms, in a variety of environments, range of distances and types of climates. Furthermore the RSTA system must be able to expand or contract along with the size of the operational area of the forces that employ it.

Mobility

Expeditionary Maneuver Warfare exploits the inherent mobility of naval forces and the use of the sea as a maneuver space. Surface and vertical maneuver elements will operate across greater distances with greater speed than ever before. RSTA assets must support these units as they seamlessly transition from maneuvering at sea to maneuvering ashore. Maneuverability fosters flexibility, which in turn permits commanders to adapt the RSTA system during execution in order to respond to changing perceived threats or opportunities. Components of the RSTA system should be retaskable and mobile enough to adjust to new missions, or to adapt to new monitoring positions. They should enable rapid and continuous maneuver and high tempo operations consistent with maneuver warfare, regardless of terrain or operational environment, to include urban operations.

Accuracy and Utility

Information provided by the RSTA system must be accurate and usable in the short time frames associated with EMW. As the use of precision weapons becomes standardized in military operations, knowing exact location, often to the foot, or even inch, is imperative for the targeting process. Reconnaissance and surveillance may not require pinpoint accuracy, but target acquisition requires a sensor grid that ultimately produces a target location or aim point suitable for attacking systems. The entire RSTA system must be worth the expense in manpower demands, logistical burden, maintenance and training costs to justify existence at each level of command supported.

RSTA 2003-2004 Experimentation

During 2003-2004, Sea Viking experimentation campaign the Lab will assess the adequacy of proposed concept of employment and supporting organization for legacy, Program of Record (POR) and experimental sensors in support of STOM. The following products from these events will provide both near-term enhancements for operating forces, prototype capabilities for further experimentation by a deploying MEU, and those that can be further developed through MCCDC/MCWL experimentation:

Doctrine.

- Future MEU and Battalion COE, with supporting organizational structure, TTPs, and CTP procedures.

- Dragon Warrior, Unmanned Ground Sensors (UGS), Marine Recon COE and TTPs.

Organization.

- Changes to T/O associated with fielding of Dragon Warrior and UGS.

Training.

- Supporting Programs of Instruction for Dragon Warrior (DW), Reconnaissance TTPs and MEU/Battalion RSTA COE.

Material.

- The Unattended Ground Sensors (UGS) will be integrated into the Lab's Expeditionary Tactical Communications System (ETCS) to transmit sensor reports to a sea-based COC via an Iridium netted Over-the-Horizon (OTH) communications system.
- Marine Reconnaissance Technologies with a goal of enhancing Marine Reconnaissance capabilities by reducing the weight of the combat load carried by Marine Recon / Scout Sniper Teams, and to enhance their capabilities to collect and disseminate gathered information to the proper level. Commercial-off-the-shelf (COTS) / Government-off-the-shelf (GOTS) equipment will be examined to include: wireless day/night camera systems, tactical day/night digital video/still camera systems, remote observation and confirming sensors, ruggedized handheld computers, stabilized binoculars, Global Positioning System (GPS) watches and other new technology advances that enable the Marine to collect information more accurately, increase stand-off ranges, move lighter, and report faster. Ultimately, recon teams will have the capability to employ a RSTA vehicle that is internally loaded on a MV-22.

Project RSTA is continuing efforts to enhance tactical reconnaissance through improvement in tactics, techniques, procedures and supporting technologies. Efforts are focused across the spectrum of environments that Marines can be called upon to operate in but with a special emphasis on urban terrain. Currently we are evaluating systems, which enable reconnaissance teams to gain militarily significant information from extended distances as well as sensors and other enabling technologies.